

CLAIMS

What is claimed is:

1 1. A method for transmitting into a medium into which a plurality of transmitters may transmit,
2 the method comprising:
3 a step for receiving a plurality of signals;
4 a step for determining a distribution model of a distribution of transmitters of the plurality
5 in accordance with received signals of the plurality;
6 a step for determining a formation model of a formation in which the transmitter is
7 positioned in accordance with received signals of the plurality;
8 a step for determining a total transmit power for a subsequent period of time, wherein the
9 total transmit power is determined in accordance with the distribution model and the formation
10 model; and
11 a step for transmitting not more than the total transmit power during the subsequent period
12 of time.

1 2. The method of claim 1 wherein the distribution model is consistent with conventional
2 interference limiting for aircraft traffic collision avoidance.

1 3. The method of claim 2 wherein:
2 the method further comprises a step for revising a parameter of the distribution model in
3 accordance with the formation model; and
4 the step for determining the total transmit power comprises a step for determining the total
5 transmit power in accordance with the revised parameter.

1 4. The method of claim 3 wherein the parameter comprises at least one of α_1 and α_2 of a
2 conventional distribution model for aircraft traffic collision avoidance.

1 5. The method of claim 1 wherein:
2 the transmitter and at least one other transmitter are part of a formation; and
3 the formation model comprises a magnitude in accordance with a distance from the
4 transmitter to the other transmitter.

1 6. The method of claim 5 wherein the formation model further comprises a magnitude in
2 accordance with an altitude of the transmitter.

1 7. The method of claim 6 wherein the formation model further comprises a count of formation
2 members having active transmitters of the plurality.

1 8. The method of claim 1 wherein:

2 the distribution model is consistent with conventional interference limiting for aircraft
3 traffic collision avoidance, each transmitter of the plurality being aboard a respective aircraft;

4 the formation model comprises a first count of formation member aircraft that are within a
5 first range, a second count of formation member aircraft that are within a second range greater than
6 the first range, and a third count of formation member aircraft that are within a third range greater
7 than the second range; and

8 the distribution model, being further consistent with the formation model, comprises a
9 fourth count of aircraft within the first range excluding the first count, a fifth count of aircraft
10 within the second range excluding the second count, and a sixth count of aircraft within the third
11 range including the third count.

1 9. The method of claim 5 further comprising a step for selecting a mode of transmitter operation
2 from at least one of an active interrogating mode and a passive non-interrogating mode, wherein
3 selection is in accordance with the distance.

1 10. The method of claim 1 further comprising:

2 a step for transmitting during the period a plurality of first priority messages and a plurality
3 of second priority messages; and

4 a step for limiting transmitting in accordance with the total transmit power and a sum of
5 each respective power allocated to each transmission of the first priority messages and the second
6 priority messages.

1 11. The method of claim 1 further for receiving transmissions transmitted from other transmitters
2 of the plurality, the method further comprising a step for determining receiver sensitivity for
3 receiving during the subsequent period of time.

1 12. The method of claim 1 further comprising transmitting into the medium in accordance with air
2 traffic control radar beacon system signaling.

1 13. The method of claim 1 further comprising transmitting into the medium in accordance with
2 Mode S signaling.

1 14. A memory comprising indicia of the method of claim 1.

1 15. A transponder comprising a processor, a receiver, and a transmitter in cooperation that perform
2 the method of claim 1.

1 16. A traffic collision avoidance system (TCAS) comprising a processor, a receiver, and a
2 transmitter in cooperation that perform the method of claim 1, wherein the processor further tracks
3 nearby traffic and initiates annunciations to a provided display.

1 17. A method for tracking proximity of vehicles of a plurality, each vehicle comprising a
2 transmitter for transmitting location information, the method comprising:
3 a step for receiving the location information;
4 a step for determining a distribution model of a distribution of transmitters of the plurality;
5 a step for determining a formation model of a formation in which the transmitter is
6 positioned; and
7 a step for determining a total transmit power for a subsequent period of time, wherein the
8 total transmit power is determined in accordance with the distribution model and the formation
9 model;
10 a step for transmitting interrogations in accordance with the total transmit power;
11 a step for determining a receiver sensitivity for receiving during the subsequent period of
12 time;

13 a step for receiving location information; and
14 a step for determining a track of a vehicle of the plurality in accordance with the received
15 location information.

1 18. A memory comprising indicia of the method of claim 17.

1 19. A traffic collision avoidance system (TCAS) comprising a processor, a receiver, and a
2 transmitter in cooperation that perform the method of claim 17, wherein the processor further
3 initiates annunciations to a provided display.

1 20. The method of claim 17 wherein:

2 the distribution model is consistent with conventional interference limiting for aircraft
3 traffic collision avoidance, each transmitter of the plurality being aboard a respective aircraft;

4 the formation model comprises a first count of formation member aircraft that are within a
5 first range, a second count of formation member aircraft that are within a second range greater than
6 the first range, and a third count of formation member aircraft that are within a third range greater
7 than the second range; and

8 the distribution model, being further consistent with the formation model, comprises a
9 fourth count of aircraft within the first range excluding the first count, a fifth count of aircraft
10 within the second range excluding the second count, and a sixth count of aircraft within the third
11 range including the third count.

1 21. A system for transmitting into a medium into which a plurality of transmitters may transmit, the
2 system comprising:

3 means for determining a distribution model of a distribution of transmitters of the plurality;

4 means for determining a formation model of a formation in which the transmitter is
5 positioned; and

6 means for determining a total transmit power for a subsequent period of time, wherein the
7 total transmit power is determined in accordance with the distribution model and the formation
8 model

9 means for transmitting into the medium in accordance with the total transmit power.

1 22. The system of claim 21 wherein the distribution model is consistent with conventional
2 interference limiting for aircraft traffic collision avoidance.

1 23. The system of claim 22 wherein:

2 the system further comprises means for revising a parameter of the distribution model in
3 accordance with the formation model; and

4 the means for determining the total transmit power comprises means for determining the
5 total transmit power in accordance with the revised parameter.

1 24. The system of claim 23 wherein the parameter comprises at least one of α_1 and α_2 of a
2 conventional distribution model for aircraft traffic collision avoidance.

1 25. The system of claim 21 wherein:

2 the means for transmitting is aboard a host vehicle and at least one other transmitter of the
3 plurality are part of a formation that includes the host vehicle; and

4 the formation model comprises a magnitude in accordance with a distance from the host
5 vehicle to the other transmitter.

1 26. The system of claim 25 wherein the formation model further comprises a magnitude in
2 accordance with an altitude of the host vehicle.

1 27. The system of claim 26 wherein the formation model further comprises a count of formation
2 members having active transmitters of the plurality.

1 28. The system of claim 25 further comprising means for selecting a mode of transmitter operation
2 from at least one of an active interrogating mode and a passive non-interrogating mode, wherein
3 selection is in accordance with the distance.

1 29. The system of claim 21 further wherein:

2 the means for transmitting transmits during the period a plurality of first priority messages
3 and a plurality of second priority messages; and

4 the system further comprises means for limiting transmitting in accordance with the total
5 transmit power and a sum of each respective power allocated to each transmission of the first
6 priority messages and the second priority messages.

1 30. The system of claim 21 further comprising:

2 means for receiving transmissions transmitted from other transmitters of the plurality; and
3 means for determining receiver sensitivity for receiving during the subsequent period of
4 time.

1 31. The system of claim 21 wherein the means for transmitting into the medium transmits in
2 accordance with air traffic control radar beacon system signaling.

1 32. The system of claim 21 wherein the means for transmitting into the medium transmits in
2 accordance with Mode S signaling.

1 33. The system of claim 21 wherein:

2 the distribution model is consistent with conventional interference limiting for aircraft
3 traffic collision avoidance, each transmitter of the plurality being aboard a respective aircraft;

4 the formation model comprises a first count of formation member aircraft that are within a
5 first range, a second count of formation member aircraft that are within a second range greater than
6 the first range, and a third count of formation member aircraft that are within a third range greater
7 than the second range; and

8 the distribution model, being further consistent with the formation model, comprises a
9 fourth count of aircraft within the first range excluding the first count, a fifth count of aircraft
10 within the second range excluding the second count, and a sixth count of aircraft within the third
11 range including the third count.

1 34. A system for tracking proximity of vehicles of a plurality, each vehicle comprising a
2 transmitter for transmitting location information, the system comprising:

3 means for receiving the location information;
4 means for determining a distribution model of a distribution of transmitters of the plurality;
5 means for determining a formation model of a formation in which the transmitter is
6 positioned; and
7 means for determining a total transmit power for a subsequent period of time, wherein the
8 total transmit power is determined in accordance with the distribution model and the formation
9 model;
10 means for transmitting interrogations in accordance with the total transmit power;
11 means for determining a receiver sensitivity for receiving during the subsequent period of
12 time; and
13 means for determining a track of a vehicle of the plurality in accordance with the received
14 location information.

1 35. The system of claim 34 wherein:

2 the distribution model is consistent with conventional interference limiting for aircraft
3 traffic collision avoidance, each transmitter of the plurality being aboard a respective aircraft;

4 the formation model comprises a first count of formation member aircraft that are within a
5 first range, a second count of formation member aircraft that are within a second range greater than
6 the first range, and a third count of formation member aircraft that are within a third range greater
7 than the second range; and

8 the distribution model, being further consistent with the formation model, comprises a
9 fourth count of aircraft within the first range excluding the first count, a fifth count of aircraft
10 within the second range excluding the second count, and a sixth count of aircraft within the third
11 range including the third count.